

CLAIMS

What is claimed is:

1. A drill insert comprising:

a drill insert body having a first end opposite a second end, a first face side opposite and parallel to a second face side, and a first land side opposite a second land side, the first and second land sides formed between the ends and the face sides;

wherein the second end comprises at least two cutting edges formed transverse to each other, wherein each cutting edge is curved; and

a groove formed in each cutting face adjacent the cutting edge, the groove having a trough substantially parallel to a plane formed through the adjacent curved cutting edge.

2. The drill insert of claim 1, wherein the cutting edges have a positive radial rake angle.

3. The drill insert of claim 1, wherein the cutting edges have a positive axial rake angle.

4. The drill insert of claim 1, wherein the cutting edges have a cutting edge treatment.

5. The drill insert of claim 1, wherein the trough of the groove is curved.

6. The drill insert of claim 1, wherein the trough of the groove is formed in a straight line.

7. The drill insert of claim 1, wherein the cutting edges have a cutting edge treatment applied thereto selected from the group consisting of a K-land, a T-land, and a hone.
8. The drill insert of claim 1, wherein at least a portion of each curved cutting edge extends beyond the plane of the corresponding face side of the drill insert body.
9. The drill insert of claim 1, wherein each land has a margin formed with a constant arcuate width between the leading side and the trailing side such that both the leading side and the trailing side are formed as a helix.
10. The drill insert of claim 1, wherein each land has a margin and the leading side of each margin is formed as a helix and wherein a helical flute is formed adjacent the leading side of each margin.
11. The drill insert of claim 10, wherein at least two apertures are formed through each face side of the drill insert body, and
wherein the helical flutes are formed radially outward of the apertures.
12. The drill insert of claim 1, wherein the helical flutes intersect with the groove on each face side of the drill body.

13. The drill insert of claim 1, wherein the first end of the drill body is a generally planar surface having at least one recess formed therein.
14. The drill insert of claim 1 further comprises a chip breaker formed through each cutting edge.
15. The drill insert of claim 1, wherein the drill insert body is comprised of a sintered metallic hard material.
16. The drill insert of claim 1, wherein the drill insert body is comprised of a material selected from the group consisting of carbide, cermet, ceramic, monocrystalline and polycrystalline diamond, and boron nitride.
17. The drill insert of claim 1, wherein the drill insert body is comprised of high speed steel.
18. A drill insert comprising:
a drill insert body having a first end opposite a second end, a first face side opposite and parallel to a second face side, and a first land side opposite a second land side, the first and second land sides formed between the ends and the face sides;
wherein the first end of the drill body is a generally planar surface having at least one recess formed in the first end;

wherein the second end comprises at least two cutting edges formed transverse to each other and wherein each cutting edge is curved;

at least two apertures formed through each face side of the drill insert body; and

a groove formed in each face side of the drill insert body adjacent the cutting edge, the groove having a trough substantially parallel to a plane formed through the adjacent curved cutting edge.

19. The drill insert of claim 18, wherein the cutting edges have a positive radial rake angle and a positive axial rake angle.

20. The drill insert of claim 18, wherein each land has a margin wherein the leading side of each margin is formed as a helix and a helical flute is formed adjacent the leading side of each margin.

21. The drill insert of claim 20, wherein the helical flutes are formed radially outward of the apertures.

22. The drill insert of claim 20, wherein the helical flutes intersect with the groove on each face side of the drill body.

23. The drill insert of claim 18, wherein at least a portion of each curved cutting edge extends beyond a plane extending from the corresponding face side of the drill insert body.

24. A drilling tool assembly comprising:

a holder having a first end and a second end, wherein the second end comprises a shank portion adapted to be fixedly attached in a drilling machine, wherein the first end comprises a holder slot having a bottom seating surface over at least a portion of the holder slot and at least one attachment arm positioned on each side of the holder slot, wherein each attachment arm has at least one aperture formed therein; and

a drill insert comprising a drill insert body having a first end opposite a second end, a first face side opposite a second face side and a first land side opposite a second land side, the first and second land sides formed between the ends and the face sides, wherein the first end of the drill body is a generally planar surface, wherein the second end comprises at least two cutting edges formed transverse to each other, wherein each of the at least two cutting edges is curved, at least two apertures formed through each face side of the drill insert body, and a groove formed in each face side of the drill insert body adjacent the cutting edge, the groove having a trough substantially parallel to a plane formed through the adjacent curved cutting edge.

25. The drilling tool assembly of claim 24, wherein the leading side of each margin is formed as a helix and a helical flute is formed adjacent the leading side of each margin.

26. The drilling tool assembly of claim 25, wherein the helical flutes are formed radially outward of the apertures.

27. The drilling tool assembly of claim 24, wherein the holder slot includes a locating boss extending from the bottom seating surface and the first end of the drill insert body has at least one recess which cooperates with the locating boss of the bottom seating surface to allow the insert to be seated against the bottom seating surface.
28. The drilling tool assembly of claim 24, wherein the holder includes at least one flushing channel.
29. The drilling tool assembly according to claim 24, wherein a fastening mechanism engages each aperture of the at least two apertures of the drill insert and a corresponding aperture of the at least one aperture in each clamp arm for securing the drill insert in position within the holder slot.
30. The drilling tool assembly according to claim 29, wherein the at least one aperture in each clamp arm is offset from the corresponding aperture in the drill insert at least to urge the drill insert against the bottom seating surface of said holder slot.